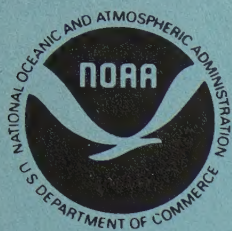


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National Marine Fisheries Service

SOUTHWEST REGION

300 S. Ferry Street

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U.S. TUNA TRADE SUMMARY, 1986

by

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OCTOBER 1988

ADMINISTRATIVE REPORT SWR-88-3



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EXECUTIVE SUMMARY

This report is the fourth annual review of the United States tuna industry prepared jointly by the Southwest Fisheries Center and the Southwest Region.

Tuna fleet activity and performance, canned tuna processing, exvessel, wholesale and retail prices, fresh tuna markets and imports are examined and compared to previous years. Nine tables and two figures present tuna industry statistics gathered from government agencies and industry contacts.

In 1986, both U.S. production capability and fleet size were at their lowest levels in a number of years. Despite this reduced capacity, U.S. catch and canned tuna production rose 6 percent and 17 percent, respectively, from 1985 and matched or in some cases surpassed the previous five-year average.

Imports of canned tuna reached a record of 12.1 million standard cases in 1986, which, when combined with U.S. production of 32.7 million cases, provided a total supply of 44.8 million cases worth \$1.1 billion to the U.S. economy.

Abundant supplies of raw tuna helped to keep exvessel prices depressed throughout the year. Lower production costs coupled with the competition from low priced canned imports kept wholesale canned tuna prices down. As a result, the retail composite canned tuna price, which decreased 2 percent in 1985, fell an additional 2 percent in 1986. This downward price trend contributed to corresponding growth in consumption of canned tuna which was a record 3.6 pounds per capita in 1986.

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INTRODUCTION AND HIGHLIGHTS

In 1986, eight major U. S. tuna canneries were in operation at three locations: California, (1); American Samoa, (2); and Puerto Rico, (5). The total imported and domestically caught raw tuna delivered to these eight U.S. canneries for processing rose sharply in 1986, increasing 12 percent from 1985, and matching the 1981-85 average volume of annual cannery receipts (Table 1, Figure 1). Cannery deliveries by domestic vessels increased 6 percent from 1985, while imports of raw tuna rose by 16 percent (Table 1).

Direct exports of domestically caught tuna were down 3 percent from 1985 but were 129 percent ahead of the five-year average. When direct exports are combined with domestic deliveries to U.S. canneries, total U.S. fleet deliveries were 5 percent greater than the corresponding amount for 1985, and 1 percent above the five-year average.

The Western Pacific Ocean¹ was the predominant production area for the U.S. fleet in 1986, providing 55 percent of the domestically caught cannery receipts and direct exports for the year (Table 2). Total domestically caught deliveries from this area increased 11 percent from 1985. The Western Pacific was also the area from which most of the raw tuna imports originated in 1986, 23 percent of total imports by oceanic area (Table 3).

The U.S. pack of canned tuna during 1986 rose 17 percent from 1985 (Table 4). When canned imports were combined with U.S. production, the total U.S. canned supply in 1986 was up 15 percent from 1985 (Table 4). Canned imports set a new record in

¹The Eastern and Western Pacific for this report are distinguished at 150 degrees West longitude.

1986, reaching 12.1 million standard cases². This represents an 11 percent increase from 1985 and an increase of 234 percent since 1981. Imports were dominated by tuna packed in water which is subject to a much lower import duty than tuna packed in oil.

No action was taken on legislation introduced into the U.S. House of Representatives (H.R. 3610) during 1985 which was aimed at eliminating the tariff difference between imports of canned tuna in water and canned tuna in oil. However, as requested by the U.S. Trade Representative, the International Trade Commission conducted a "332 investigation" during 1986 for the purpose of gathering, presenting, and analyzing information on the competitive and economic factors affecting the performance of the U.S. tuna industry (U.S. International Trade Commission, 1986). Unlike the Commission's 1984 "201 investigation" (U.S. International Trade Commission, 1984), the 332 study was not conducted in response to a petition for import relief, but rather, to update the information collected for the previous investigation. Therefore, it did not require a determination on the Commission's part as to whether such relief was warranted.

The retail composite canned tuna price, which decreased 2 percent in 1985, fell an additional 2 percent during 1986. The downward price trend contributed to corresponding growth in overall apparent consumption. On the fresh fish front, landings and sales of U.S. fresh and fresh-frozen tuna products continued to improve during 1986.

The following sections review the 1986 production of white and light meat tuna by the U.S. tuna industry and consumption of tuna products by U.S. consumers. In the final section the economic performance of the U.S. tuna purse seine fleet is analyzed and updated for the period 1979-85.

² A standard case consists of 48 6.5-ounce cans or 19.5 pounds.

PRODUCTION AND PROCESSING OF ALBACORE (WHITE MEAT) TUNA

Albacore, which is the only species that may be canned as white meat tuna in the United States (21 CFR 161.190 (a)(4)(i)) accounted for approximately 25 percent of the total U.S. tuna pack in 1986 (Table 4). Total cannery receipts -- domestically caught albacore plus imports -- reached 115,819 tons in 1986, 14 percent above receipts for 1985 and 17 percent above the 1981-1985 average (Table 1). Domestic white meat production for 1986 amounted to 8.1 million standard cases (Table 4), 19 percent above the pack in 1985.

U.S. Albacore Production and Fleet Activity

Historically, the U.S. albacore fishery has occurred almost entirely in the Pacific Ocean north of 25° N latitude and offshore from the U.S. west coast to approximately 180° W longitude. This area is divided at 140° W longitude into offshore (mid-Pacific) and inshore fishing areas. Troll (jig) gear is the dominant gear used by U.S. fishermen.

The volume of domestically caught North Pacific albacore delivered to U.S. canneries in 1986 totaled 3,527 tons, 49 percent less than the amount in 1985 (Table 1). This represents a 76 percent decrease in the average volume over the last five years. In addition 1,157 tons of domestically caught albacore were exported during 1986 to France, Japan, Spain and Thailand (G.K. Alameda, Premium Tuna, personal communication)³.

Although U.S. fishermen have traditionally harvested considerable amounts of albacore from the North Pacific, the

³U.S. albacore exports do not appear under direct exports in Table 1 because albacore exported in 1986 was initially landed in the United States and then exported through brokers.

South Pacific is currently developing into what could be a major alternative albacore fishing area: some large U.S. trollers are alternating between the North and South Pacific, fishing in each during their respective summers. The number of U.S. albacore trollers operating in the South Pacific is expected to increase substantially in 1987, amidst reports of favorable catch rates and ready markets.

A generally abundant supply of albacore being offered through the international market during 1986 kept contract prices for domestically caught albacore delivered to U.S. canneries at relatively low levels throughout the year: \$1,100 per ton for fish 9 pounds or greater and \$750 per ton for fish under 9 pounds (Table 5). This represents a 10 percent increase and a 6 percent decrease in respective prices at the end of 1985. Prices at year-end 1985 and 1986 were the lowest they have been in the past 6 years.

With the decline in domestically caught receipts and exvessel prices, aggregate exvessel revenue from the 1986 albacore fishery fell 48 percent from that of 1985. However, dividing exvessel albacore revenue by total cannery deliveries yields a weighted exvessel price of \$1,108 per ton for 1986, a 2 percent gain from 1985 (Table 6).

Processing of Canned White Meat Tuna

The primary U.S. tuna receiving and processing sites during 1986 were Mayaguez and Ponce, Puerto Rico; San Pedro, California; and Pago Pago, American Samoa. For reporting purposes, tuna receipts and processing data are combined for American Samoa and California. Data for Puerto Rico are reported separately.

Seventy-five percent of the raw albacore supplied to U.S. canneries in 1986 was delivered to canneries in Puerto Rico and

the balance to canneries in American Samoa and California. There was a 14 percent increase from 1985 in the amount of albacore delivered to Puerto Rico and a 13 percent gain in the amount delivered to American Samoa and California. Of the total 1986 domestically caught albacore receipts, 92 percent was received in American Samoa and California and the remainder was transshipped from west coast ports to canneries in Puerto Rico (Table 1). This was a 42 percent reduction from 1985 in domestically caught albacore deliveries to American Samoa and California and a 76 percent decrease in domestically caught albacore transshipments to Puerto Rico.

U.S. cannery receipts of imported raw albacore totaled 112,292 tons in 1986, an 18 percent increase from 1985 (Table 1). Imports accounted for 97 percent of the 1986 total cannery supply of albacore compared with 93 percent in 1985. Puerto Rico was the major receiving site for imports with 77 percent of the total albacore imports; American Samoa and California received the remainder.

Albacore imports received in Puerto Rico during 1986 increased 15 percent from 1985, and imports received in American Samoa and California increased 29 percent. The leading point of origin of raw albacore shipments to U.S. canneries was South Africa, a major transshipping base for Japanese and Taiwanese vessels, which accounted for 24 percent of the total imports (Table 7).

Imports of raw albacore received at U.S. canneries in 1986 were valued at approximately \$163 million,⁴ up 6 percent from 1985. Dividing this value by the corresponding volume yields a

⁴The values of raw imported tuna (white and light meat) are computed using the declared value reported by importers to the U.S. Customs Service, and volumes of imports compiled by the Statistics and Market News Service, NMFS, Southwest Region.

weighted average import price of \$1,450 per ton for raw albacore in 1986, nearly 10 percent below that for 1985.

In 1986, 62 percent of the total U.S. cannery supply of raw albacore came from the Atlantic Ocean followed by the Pacific and Indian Oceans which contributed 28 percent and 10 percent, respectively, to the total supply. All of the albacore received from the Atlantic and Indian Oceans consisted of imports. Receipts of albacore from the Atlantic Ocean increased 28 percent from 1985, those from the Pacific decreased 9 percent, and those from the Indian Ocean increased 4 percent (Tables 2 and 3).

During 1986, wholesale list prices for U.S.-produced, nationally advertised brands of white meat tuna ranged between \$57 and \$59 per standard case. With discounts, the actual selling price at wholesale was as low as \$42 for a standard case which represented a decrease of 7 percent from 1985. Production of both advertised and private brands of white meat tuna was valued at approximately \$321 million (free-on-board (FOB) plant value) in 1986, up 16 percent from 1985. Based on total white meat volume, the weighted average value in 1986 was \$39.75 per standard case which was a slight drop from \$39.89 for the equivalent size case in 1985.

PRODUCTION AND PROCESSING OF LIGHT MEAT TUNA

In the United States, skipjack, yellowfin, bigeye, blackfin, and bluefin tuna are collectively canned as light meat tuna. The 6.5-ounce can of chunk style, light meat tuna in water has been the most popular tuna product consumed in the United States in recent years.

Processing of canned light meat tuna by U.S. canners during 1986 increased considerably from 1985. The domestic pack of all light meat products totaled 24.6 million standard cases in 1986,

16 percent above the pack for 1985 (Table 4). The total cannery supply of raw light meat tuna for 1986 was 407,832 tons, up 11 percent from 1985 (Table 1). Prices of light meat tuna at the exvessel and wholesale levels continued to decline during 1986.

U.S. Light Meat Production and Fleet Activity

Receipts of domestically caught, light meat tuna at U.S. canneries totaled 223,666 short tons in 1986, 8 percent above receipts for 1985. This total comprised 90,605 tons of skipjack tuna and 133,061 tons of yellowfin tuna (includes small quantities of bigeye, bluefin and blackfin tuna), an 8 percent increase in both skipjack and yellowfin deliveries from 1985. In addition to deliveries at U.S. canneries, U.S. flag vessels exported 22,207 tons of skipjack tuna and 11,539 tons of yellowfin tuna to foreign canneries in 1986, up 13 percent and down 24 percent respectively from 1985 (Table 1).

The U.S.-flag tuna fleet consisted of 110 vessels with an overall carrying capacity of 99,594 tons at the outset of 1986: 92 purse seiners and 18 baitboats (pole-and-line gear). By the end of 1986, the fleet had declined to 88 vessels, 84 purse seiners and four baitboats with a total carrying capacity of 92,732 tons, a 20 percent loss in number and a 7 percent decrease in total capacity from the beginning of the year. In addition, 17 of these 88 vessels were listed as inactive, and all of the inactive vessels were seiners having individual carrying capacities of 400 tons or more.

During 1986, the fleet operated almost exclusively in the Pacific Ocean. There were 33 vessels active in the Western Pacific during the first quarter of 1986 with a combined carrying capacity of 40,675 tons. The number operating in the Western Pacific rose to 35 by the end of 1986 with a capacity of 42,455

tons. Thirty-five purse seiners with a total carrying capacity of 34,095 tons operated in the Eastern Pacific during the first quarter of 1986, increasing to 36 vessels with a capacity of 33,667 tons by the end of the year. Only three U.S.-flag vessels, having a combined capacity of 3,180 tons, fished in the Caribbean area of the Atlantic Ocean during 1986.

In the early 1980's, the U.S. tuna fleet increased its operations in the Western Pacific. The United States does not recognize national jurisdiction over tunas (highly migratory species) beyond 12 nautical miles from coastlines. However, all Pacific Island states claim jurisdiction over tuna to 200 miles from their coasts.

To resolve this problem, the United States opened negotiations for a South Pacific regional licensing arrangement with 16 Pacific island states in 1986, with formalization of the arrangement scheduled for 1987. Terms of the regional licensing pact include provisions for vessel licensing, economic assistance and technical assistance to be provided by the federal government and by the U.S. tuna industry.

A second problem arose on October 21, 1986 when National Oceanic and Atmospheric Administration issued a rule prohibiting U.S. flag tuna purse seiners in excess of 400 short tons capacity from catching, possessing or landing yellowfin or bigeye tuna from the Eastern Tropical Pacific Ocean (ETP). The rule was implemented after National Marine Fisheries Service calculations indicated that the annual allowable incidental quota for porpoise taken in association with tuna purse seine fishing, 20,500 animals, had been reached. The prohibition was in effect from the date of closure until December 31, 1986. During the closure period, only vessels that voluntarily carried a NMFS observer to verify that porpoise were not set upon were allowed to fish in the ETP.

Along with the prohibition on U.S. purse seiners, imports of yellowfin and bigeye tuna from nations fishing in the ETP were also prohibited. The import prohibition was to be active from the purse seine closure date to July 31, 1987, in order to prevent stockpiling of fish caught during the closure and subsequently imported after January 1, 1987. Imports were allowed from harvesting nations certifying that the yellowfin and bigeye tuna were taken by fishing operations conforming to U.S. standards or that the fish were taken outside the ETP or not during the closure period.

In the face of potentially poor trips, several U.S. vessels declined to leave port during the closure (American Tunaboat Association, Living Marine Resources, Inc., personal communications). This may have had an influence on the 15 percent decline in U.S. purse seine effort in the ETP in the fourth quarter of 1986 compared to effort in the same period in 1985.

Potential losses to U.S. fishermen were offset somewhat by successful fishing on non-porpoise related schools and by increases in price paid for skipjack toward the end of the year. Statistics indicate a 36 percent decline in ETP yellowfin deliveries by the U.S. purse seine fleet in the fourth quarter of 1986 compared to the fourth quarter 1985. On the other hand, fourth quarter 1986 deliveries of ETP skipjack increased substantially from the fourth quarter 1985. Therefore, total fourth quarter 1986 deliveries of light meat tuna from the ETP declined only 11 percent compared to 1985.

At the beginning of 1986, contract exvessel prices, without quality adjustments⁵, for most size classes of skipjack and

⁵Contract prices may be adjusted for salt content, temperature of the fish, physical condition of the fish at unloading, and other quality criteria.

yellowfin were comparable to 1985 contract prices. Exvessel prices declined slightly in March but began to recover in November (Table 5).

Receipts of domestically caught skipjack tuna were valued at \$56 million in 1986, up 7 percent from 1985. This yields a weighted average exvessel price of \$616 per ton, a 1 percent decrease from 1985. Domestic deliveries of yellowfin tuna generated approximately \$99 million in exvessel revenue for 1986, 2 percent below 1985. The weighted average exvessel price for yellowfin tuna in 1986 was \$743 per ton, a decrease of 9 percent from 1985 (Table 6). Total exvessel revenue was approximately \$155 million in 1986, 1 percent greater than that for 1985.

Processing of Canned, Light Meat Tuna

During 1986, 407,832 tons of raw, light meat tuna were delivered to U.S. canneries in Puerto Rico, American Samoa, and California (Table 1). Puerto Rico received 248,444 tons in 1986, 61 percent of the total; the balance, 159,388 tons, was received at canneries in American Samoa and California. Total receipts for Puerto Rico increased 5 percent from 1985 and rose 22 percent for American Samoa and California (Table 1).

Domestically caught, light meat tuna deliveries to canneries in Puerto Rico during 1986 reached 94,743 tons, 42 percent of the total domestically caught, light meat deliveries for 1986. The remainder, 128,923 tons, went to canneries in American Samoa and California. Compared with 1985, domestically caught, light meat tuna deliveries to Puerto Rico fell 10 percent, while deliveries to American Samoa and California rose 26 percent (Table 1). Imports of light meat tuna totaled 184,166 tons in 1986, 15 percent above the level of imports for 1985. Imports made up 45 percent of the total cannery supply in 1986 versus 44 percent in

1985. Puerto Rico was the major receiving site for imports during 1986 accounting for 153,701 tons (83 percent of the total), a 17 percent increase from 1985 (Table 1). Skipjack made up 56 percent of the 1986 light meat imports, yellowfin the balance. Overall, skipjack tuna imports were up 16 percent from 1985, while yellowfin imports increased 18 percent.

The Seychelles was the top exporter of raw light meat tuna to the United States in 1986 with 30,866 tons, 17 percent of the 1986 total. Venezuela followed with 27,450 tons, 15 percent of the total. Also in 1986, Mexico resumed exports of frozen light meat tuna to the United States, 3,331 tons through December 31 (Table 7).

The embargo on U.S. imports of Mexican-caught tuna and Mexican tuna products, which was instituted in July, 1980, after the seizure of U.S. tuna vessels within Mexico's 200-mile Exclusive Economic Zone, was lifted in August 1986. Recognizing the potential economic stress that an inundation of exports could impose on the U.S. tuna industry, Mexico agreed to voluntarily limit its exports of tuna products to the United States, which would presumably consist mainly of frozen light meat tuna, to the following maximum levels beginning September 1, 1986:

12-month period ending --	Volume	
	Short tons	Metric tons
August 31, 1987	19,290	17,500
August 31, 1988	24,802	22,500
August 31, 1989	30,314	27,500

Source: Office of Fisheries Affairs, U.S. Department of State.

After August 31, 1989, there will be no voluntary restraint on exports to the United States.

Light meat imports in 1986 were valued at \$151 million, up 16 percent from 1985. The value of skipjack tuna imports was approximately \$80 million and the value of yellowfin tuna imports was approximately \$71 million, increases from 1985 of 18 percent for skipjack and 14 percent for yellowfin. These values convert to weighted average prices of \$763 per ton for imported skipjack tuna and \$899 per ton for imported yellowfin tuna, an increase of about 7 percent and a decrease of less than 1 percent, respectively, from 1985.

Light meat cannery receipts and U.S. exports of light meat tuna totalled 441,578 tons in 1986. The Pacific Ocean provided 356,410 tons or 81 percent of this total, the Atlantic Ocean 11 percent, and the Indian Ocean 8 percent. On a regional basis, the Western Pacific was the leading production area with 179,309 tons, 42 percent of total U.S. receipts and exports. Of the total receipts originating in the Western Pacific during 1986, 33 percent (143,408 tons, which includes U.S. exports) was domestically caught and the remainder (38,984 tons) consisted of imports. Skipjack tuna was the predominant species in the receipts from the Western Pacific. Other oceanic regions contributing to the 1986 U.S. cannery supply and U.S. raw exports were in order of importance, the Eastern Pacific -- primarily domestically caught yellowfin tuna; the Indian Ocean -- primarily skipjack imports; the Eastern Atlantic, and the Western Atlantic. A breakdown of the 1985 cannery supply and U.S. exports by ocean of origin is given in Tables 2 and 3.

The wholesale list price of U.S. produced, advertised, light meat tuna ranged between \$34.20 and \$43.45 a standard case, but with discounts the price fell as low as \$26 a case during the year. Total production of canned light meat tuna, both advertised and private label brands, was valued at \$561 million (FOB plant value) in 1986, up 2 percent from 1985. This results

in a weighted average value of \$22.80 for a standard case of light meat tuna in 1986, a decrease of 12 percent from 1985.

CANNED IMPORTS

Foreign processed canned tuna packed in oil is subject to a 35 percent tariff and therefore imports are negligible. Foreign processed canned tuna not in oil is under a tariff rate quota which allows imports of up to 20 percent of the previous year's domestic production, excluding American Samoa, to enter at 6 percent ad valorem; imports above the quota level enter at 12.5 percent ad valorem. Canned tuna not in oil entering the continental United States from American Samoa is not counted against the quota. Before the quota on canned imports not in oil is reached, the Bureau of the Census categorizes white meat and light meat imports separately. However, once the quota is reached, there is no longer a distinction between white and light meat imports. Thus, year-end figures comprise imports of both canned light and white meat not in oil.

In 1986, the quota on canned imports not in oil was 81.1 million pounds or 4.2 million standard cases. Total imports reached a record 236.6 million pounds or approximately 12.1 million standard cases, an increase of 11 percent from 1985 (Table 4). When the 1986 quota was reached in late March, white meat made up 17 percent of the imports of canned tuna not in oil. Imports of canned tuna in oil, practically all light meat tuna, totaled 301,000 pounds or about 15,000 standard cases, virtually the same as in 1985.

The leading exporter of canned tuna to the United States in 1986 was Thailand with 152.3 million pounds or 7.8 million standard cases (Table 8). This was 64 percent of total imports and represents a 24 percent increase from 1985 in imports from

Thailand. The Philippines was a distant second with 28.6 million pounds or 1.4 million standard cases, 12 percent of the 1986 total.

Imports in 1986 were valued at approximately \$229 million FOB, an increase of 9 percent from 1985. This converts to a weighted average price of \$0.97 per pound or \$18.87 per standard case, which is 1 percent below that for 1985 (Table 8).

CONSUMPTION

Canned Tuna

Consumption of canned tuna products in the United States for 1986 (excluding non-civilian consumption) was calculated to be 3.6 pounds per capita, 9 percent greater than 1985. An informal survey of industry members indicates that tuna was consumed at a ratio of approximately 21 percent white meat to 79 percent light meat. Based on these figures, per capita consumption was approximately 0.76 pounds of white meat tuna and 2.84 pounds of light meat tuna. This converts to 1.9 standard cans of white meat tuna and 6.9 standard cans of light meat tuna per capita. When compared with consumption in 1985, based on the same consumption pattern, there was a 15 percent increase in white meat consumption and a 7.5 percent increase in light meat consumption.

Fresh Tuna

U.S. production and consumption of fresh albacore, bluefin, bigeye, and yellowfin tuna continued to grow in 1986. Off the U.S. east coast, from Maine to Virginia, Atlantic bluefin tuna are harvested primarily for export to Japan. The Atlantic

bluefin tuna fishery is highly regulated and catch quotas (by fish size and harvesting gear) are imposed through the International Commission for the Conservation of Atlantic Tunas. In 1986, U.S. fishermen, using a variety of gears including purse seine, longline, rod and reel, and handlines, landed 1,050 short tons of Atlantic bluefin. Approximately 80 percent of the 1986 landings of sashimi-quality giant bluefin was exported to Japan with the remainder going to U.S. fresh fish markets (Northeast Regional Office, NMFS, personal communication).

In an attempt to satisfy a strong export market to Japan and an increasing domestic demand, east and gulf coast fishermen are expanding fishing effort on bigeye and yellowfin tuna. In 1986, domestic bigeye tuna landings destined for fresh consumption were approximately 660 short tons, which exceeded 1985 landings by 77 percent. The average exvessel price for large, high-quality bigeye tuna exported to Japan in 1986 was \$7,900 per short ton (Southeast Fisheries Center, NMFS, personal communication). Landings of yellowfin tuna from both the southeast Atlantic coast and Gulf of Mexico fisheries were also on the rise during 1986. Preliminary reports placed landings at 3,530 short tons, an increase of 90 percent over 1985 landings (Southeast Fisheries Center, NMFS, personal communication). Data on exvessel prices is limited. However, reports indicate prices, which are strongly related to grade, reached \$5 per pound in 1986 (Florida Sea Grant, personal communication).

Bluefin tuna continues to be a target species for fishermen from southern California, particularly fishermen of the San Pedro wetfish fleet. In recent years, exvessel prices have been rising, not only because of the continued desirability of bluefin in the Japanese market but also due to the increasing domestic demand for bluefin by the sushi restaurant trade nationwide. In 1986, 5,206 short tons of bluefin were landed on the west coast, largely for the fresh fish market.

West coast landings of albacore destined for fresh consumption during 1986 totaled 1,200 tons valued at \$1.3 million. Fresh-caught albacore from the west coast has been the subject of a large-scale promotional campaign over the last few years, aimed at increasing interest in quality albacore among restaurateurs and fresh fish retailers. According to industry sources, approximately 200 tons of the total domestically caught fresh albacore were channeled through the albacore alternative marketing program during 1986 (Tennyson and Associates, personal communication). Exvessel prices for this high-quality albacore reportedly ranged from under \$1,100 per ton to \$1,500 per ton with an average of \$1,250 per ton, which was 14 percent higher than the average cannery price.

Landings of fresh tuna in Hawaii totaled 3,400 tons worth \$9.6 million in 1986. In 1986, U.S. imports of fresh tuna, primarily yellowfin, received in California amounted to 1,500 tons with a value of \$5 million. This compares to imports of 1,109 tons having a value of \$2.9 million in 1985.

PERFORMANCE OF THE U.S. PURSE SEINE FLEET

To provide a more current evaluation of the economic performance of the U.S. tropical tuna purse seine fleet, the purse seine "fleet performance index" developed by Herrick and Koplin in 1986,⁶ has been updated through 1985. The fleet performance index (FPI) is a composite index, constructed from an aggregate output price index (OPI), an aggregate input price index (IPI), and a total factor productivity index (TFPI) which

⁶ See Herrick, Jr., S. F. and S. J. Koplin. 1986. U.S. tuna trade summary, 1985. Admin. Report SWR-86-10. Southwest Region, National Marine Fisheries Service, NOAA.

respectively account for changes in exvessel prices, input prices, and changes in cannery deliveries relative to corresponding changes in the quantity of inputs used.

The aggregate output price index is a weighted average of exvessel price indexes for skipjack and yellowfin tuna over the 1979-85 time period (1979 serves as the base year, $t=0$, in the construction of all indexes). Exvessel prices for skipjack and yellowfin tuna were obtained by dividing the total dollar value of cannery receipts for each species by total cannery receipts. Nominal output prices were then converted to 1972 constant dollars using the U.S. Gross National Product (GNP) implicit price index. The weights used in calculating the aggregate output price index are the relative contributions of skipjack and yellowfin revenues to total exvessel revenue. Table 9 presents the price and revenue share data used in calculating the aggregate output price index; the aggregate output price index is shown in Figure 2.

The aggregate input price index is a weighted average of price indices for major categories of factors used in owning and operating a purse seine vessel in the U.S. tropical tuna fishery. The inputs considered are labor, capital, fuel, and other intermediate inputs. Constant dollar, unit prices for these inputs, over the 1979-85 period, were estimated based on purse seine expenditure data reported by the U.S. International Trade Commission (ITC, 1986), data from the Inter-American Tropical Tuna Commission on days absent from port for the U.S. purse seine fleet, and annual average fuel prices from the American Tunaboat Association (V. Bernadino, ATA, personal communication).

The unit price of labor, cost per crew day absent, was estimated by dividing the sum of the ITC's reported annual per vessel expenditures on crew and galley by a measure of annual crew days absent per vessel. Annual crew days absent for U.S.

purse seiners were derived by multiplying estimated total days absent per vessel by 19 crew members, which is the assumed average crew complement in each year of the period.

The sum of the annual interest expense and reported depreciation per vessel from the ITC sample was used as the unit price of capital services in constructing the aggregate input price index.

Other intermediate inputs consist of transshipment services, repairs, gear, insurance, helicopter services, travel, and other. The sum of the nominal expenditures on these inputs per vessel was deflated by the producer price index for industrial commodities to represent the collective use of these inputs in real terms. The nominal expenditure for this category of inputs divided by the corresponding deflated expenditure is used as a proxy for the unit price for other intermediate inputs.

The weights used in calculating the aggregate input price index are the expenditures on each input category relative to the total expenditures on inputs. These weights are computed from the ITC expenditure data and are presented in Table 9 along with the price data used in constructing the aggregate input price index. The aggregate input price index is shown in Figure 2.

Changes in factor productivity, output per unit input, are accounted for through the total factor productivity index which is simply the ratio of a aggregate output index to an aggregate input index. The aggregate indices of outputs and inputs are formed from Tornqvist-Theil (T-T) quantity indexes for each output produced and input used.⁷

⁷For a discussion of the properties of such a TFP index see Christensen (1975), and Squires (in press). For an application of this type of TFP to the Pacific coast groundfish fishery, see: Squires, D. 1987. Productivity measurement in the Pacific trawl fleet. Admin. Report LJ-86-24. Southwest Fisheries Center, National Marine Fisheries Service, NOAA.

Annual output consists of the volume of domestically caught skipjack and yellowfin tuna delivered to U.S. canneries over the 1979-85 period. The number of active purse seine vessels comprising the U.S. fleet in each of the years 1979-85 is used as a measure of capital stock. Aggregate labor usage is measured in crew days absent as described above. An estimate of annual fleet fuel consumption is obtained by dividing annual fuel expenditure per vessel from the ITC sample by average fuel prices provided by the ATA. Fuel consumption per vessel is then multiplied by the number of vessels in the fleet to get total fuel consumption. The quantity of other intermediate inputs used annually is approximated by deflating the nominal expenditure on this category of inputs by the producer price index for industrial commodities to obtain relative use in constant dollars. The quantity data used to construct the total factor productivity index is shown in Table 9 together with the T-T indexes and the aggregate output and input indexes. The total factor productivity index is displayed in Figure 2.

By combining the aggregate output price index, the aggregate input price index, and the total factor productivity index, the composite fleet performance index can be written as:

$$FPI_t = OPI_t * TFPI_t / IPI_t$$

where the terms to the right of the equals sign are those indices described above. The FPI is an expression of the economic performance of the fleet in the year "t" relative to the base year 1979. The FPI (Figure 2) denotes the collective effect of changes in revenues, costs, and fleet productivity on fleet performance over the 1979-85 period.

Based on projections using the purse seine cost-earnings data from the 1986 ITC investigation, it was found that the U.S. fleet experienced a net accounting loss in the base year, 1979. When interpreting subsequent values of the FPI, a value greater

than one in year "t" does not necessarily mean that the fleet realized a profit in that year. It means that the fleet improved economic performance relative to the base year -- that is, the fleet could be earning a profit in "t"; it could be just breaking even in year "t"; or it is continuing to operate at a loss in year "t," although the loss will not be as great as in the base year. Conversely, if the index in "t" is less than one, the fleet is performing worse than it did in the base year. Also, the indices are calculated for the fleet and therefore will not necessarily be indicative of the performance of an individual vessel. When a marginally performing vessel exits the fishery, fleet performance may improve due to an increase in overall productivity.

The slight improvement in the FPI through 1980 can be attributed to an increase in output prices which more than offset the increase in input prices and the decrease in total factor productivity. During 1981, the FPI fell as output prices declined more sharply than input prices, and total factor productivity continued to drop. This trend continued through 1982, but in 1983 there was a major reduction in the size of the fleet accompanied by a significant increase in tropical tuna cannery deliveries producing a sharp increase in the total productivity index. Because this was accompanied by another decrease in input prices, the FPI improved despite a further decline in output prices. The total productivity index continued to climb through 1984 as the fleet contracted further while aggregate output remained relatively unchanged. Nonetheless, the FPI dropped as output prices fell and input prices remained about the same. Another significant reduction in the size of the fleet during 1985, with little change in cannery deliveries, led to an increase in total factor productivity. However, this occurrence together with a drop in input prices did not offset the decrease in output prices; hence the decline in the FPI.

The changes in the indexes over the 1979-85 period are not unexpected given the developments in international supply and expansion of the fishery into more productive grounds. Exvessel prices have been depressed as the supply of raw tuna has increased, and at the same time input prices have remained relatively steady. This compels individual vessels to improve productivity to maintain overall performance, or leave the fishery. On a fleetwide basis, this is probably reflected by the total factor productivity index for 1983, the year in which there was a major push by the U.S. fleet into the Western Pacific, a significant increase in cannery deliveries, and a substantial decrease in the number of active vessels.

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Table 2.-U.S. domestic tuna cannery receipts and direct exports (short tons) by ocean of origin, 1981-86.

Ocean	Albacore							Skipjack						
	1981	1982	1983	1984	1985	1986	81-85 Avg.	1981	1982	1983	1984	1985	1986	81-85 Avg.
E. Atlantic	2	62	-	-	-	-	13	3,327	27	21	-	-	-	675
W. Atlantic	4	-	4	-	1	-	2	108	-	3	944	2,079	1,825	626
E. Pacific	13,954	5,099	9,434	13,409	6,021	3,158	9,583	74,116	59,264	40,181	22,359	4,992	7,938	40,183
W. Pacific	897	1,866	1,032	587	831	369	1,042	20,571	42,546	114,913	137,678	96,618	103,049	82,465
Indian	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	14,857	7,027	10,470	13,996	6,853	3,527	10,640	98,122	101,837	155,118	160,981	103,689	112,812	123,949

Ocean	Yellowfin 1/							Total						
	1981	1982	1983	1984	1985	1986	81-85 Avg.	1981	1982	1983	1984	1985	1986	81-85 Avg.
E. Atlantic	1,966	1,087	-	-	-	-	611	5,295	1,176	21	-	-	-	1,299
W. Atlantic	502	115	70	1,550	4,185	839	1,284	614	115	77	2,494	6,265	2,664	1,912
E. Pacific	110,251	96,640	65,863	60,753	101,897	103,402	87,081	198,321	161,003	115,478	96,521	112,910	114,498	136,847
W. Pacific	14,534	24,290	54,701	49,777	31,982	40,359	35,058	36,002	68,702	170,646	188,042	129,431	143,777	118,564
Indian	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	127,253	122,132	120,634	112,080	138,064	144,600	124,033	240,232	230,996	286,222	287,057	248,606	260,939	258,622

Note: Cannery receipts include imported and domestically caught tuna delivered to U.S. processors. Excluded are U.S. caught tuna destined for export or for the fresh tuna market and imported tuna destined for the fresh tuna market or designated as "flakes" and "not fit for human consumption." Direct exports include U.S. caught tuna landed directly in, or transshipped to a foreign country; excludes tuna exported from the U.S. east and west coasts.

1/ Includes Bigeye, Blackfin, and Bluefin Tuna

Source: Statistics and Market News, Southwest Region, NMFS, NOAA.

Table 3.-U.S. Imported tuna cannery receipts (short tons) by ocean of origin, 1981-86.

Ocean	Albacore							Skipjack						
	1981	1982	1983	1984	1985	1986	81-85 Avg.	1981	1982	1983	1984	1985	1986	81-85 Avg.
E. Atlantic	17,105	19,815	16,935	27,392	30,655	35,475	22,381	67,011	49,417	34,358	35,882	10,828	19,713	39,499
W. Atlantic	16,894	21,129	16,127	17,209	25,486	36,631	19,369	8,754	17,119	18,070	9,059	20,650	15,434	14,731
E. Pacific	22	48	243	439	-	-	150	9,409	11,916	4,501	9,245	17,146	15,733	10,443
W. Pacific	43,638	35,374	23,226	32,340	28,667	28,916	32,649	95,119	44,017	72,742	72,699	30,427	24,604	63,001
Indian	9,638	18,232	16,324	15,464	10,344	11,270	14,000	7,716	5,546	5,637	7,988	13,581	29,547	8,094
Total	87,297	94,598	72,855	92,844	95,152	112,292	88,549	188,009	128,015	135,308	134,873	92,632	105,031	135,768

Ocean	Yellowfin 1/							Total						
	1981	1982	1983	1984	1985	1986	81-85 Avg.	1981	1982	1983	1984	1985	1986	81-85 Avg.
E. Atlantic	19,561	9,320	4,618	3,258	5,075	5,949	8,366	103,677	78,552	55,911	66,532	46,558	61,137	70,246
W. Atlantic	5,200	3,058	6,446	3,259	10,910	5,507	5,775	30,848	41,306	40,643	29,527	57,046	57,572	39,875
E. Pacific	16,039	19,200	7,492	9,222	29,572	46,945	16,305	25,470	31,164	12,236	18,906	46,718	62,678	26,898
W. Pacific	41,340	18,800	18,814	23,799	15,262	14,380	23,603	180,097	98,191	114,782	128,838	74,356	67,900	119,253
Indian	1,448	835	962	2,192	6,542	6,354	2,396	18,802	24,613	22,923	25,644	30,467	47,171	24,490
Total	83,588	51,213	38,332	41,730	67,361	79,135	56,445	358,894	273,826	246,495	269,447	255,145	296,458	280,762

Note: Cannery receipts include imported and domestically caught tuna delivered to U.S. processors. Excluded are U.S. caught tuna destined for export or for the fresh tuna market and imported tuna destined for the fresh tuna market or designated as "flakes" and "not fit for human consumption." Direct exports include U.S. caught tuna landed directly in, or transshipped to a foreign country; excludes tuna exported from the U.S. east and west coasts.

^{1/} Includes Bigeye, Blackfin, and Bluefin Tuna

Source: Statistics and Market News, Southwest Region, NMFS, NOAA.

Table 4.-U.S. supply of canned tuna, volume and value, 1975-86.

Year	Case pack supply (1,000 standardized cases) ^{1/}						Total
	Domestic production				Canned Imports		
	White		Light				
		% ^{2/}		%			
1975	5,296	17.8	21,854	73.3	2,650	8.9	29,800
1976	6,312	18.7	24,416	72.3	3,020	9.0	33,748
1977	6,559	21.9	21,544	72.1	1,776	6.0	29,879
1978	7,528	19.4	28,615	73.8	2,655	6.8	38,798
1979	6,129	17.7	25,678	74.3	2,754	8.0	34,561
1980	5,825	17.1	25,049	73.4	3,259	9.5	34,133
1981	6,204	17.3	25,948	72.5	3,633	10.2	35,785
1982	6,416	20.0	21,199	66.0	4,491	14.0	32,106
1983	5,444	14.9	24,844	68.0	6,273	17.1	36,561
1984	7,012	17.6	24,489	61.5	8,324	20.9	39,825
1985	6,764	17.4	21,185	54.4	10,972	28.2	38,921
1986	8,069	18.0	24,589	54.9	12,134	27.1	44,797

Case pack value (1,000 dollars)

1975	136,678	19.6	515,957	73.8	45,951	6.6	698,586
1976	212,869	23.1	640,594	69.6	67,502	7.3	920,965
1977	240,734	25.3	665,880	70.0	44,658	4.7	951,272
1978	296,506	22.2	976,754	73.0	63,822	4.8	1,337,082
1979	243,851	20.9	859,998	73.6	65,071	5.5	1,168,920
1980	252,290	20.3	891,237	71.9	97,254	7.8	1,240,781
1981	294,292	22.8	885,846	68.6	110,359	8.6	1,290,497
1982	275,400	26.7	643,046	62.3	113,346	11.0	1,031,792
1983	197,011	19.8	661,586	66.4	137,324	13.8	995,921
1984	255,997	24.6	616,280	59.3	167,268	16.1	1,039,545
1985	269,887	26.2	550,882	53.5	209,138	20.3	1,029,907
1986	320,795	28.9	560,723	50.5	227,919	20.4	1,109,437

^{1/} For ease of comparison a standard case will represent 48 6.5-ounce cans or 19.5 pounds.

^{2/} A % symbol denotes the percent of total for each canned category.

Source:

Domestic: U.S. Department of Commerce. 1976-1986. Fisheries of the United States, 1976-1986. Current Fishery Statistics Nos. 6900, 7200, 7500, 7800, 8000, 8100, 8200, 8300, 8320, 8360, 8380, 8385, NOAA, National Marine Fisheries Service, Washington, D.C., various pagination.

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Imports: U.S. Department of Commerce, Bureau of the Census Computerized data files, 1974-1986.

Table 5.-U.S. cannery exvessel (contract) prices (dollars per short ton) at California and Puerto Rico, 1980-86.

Year	Albacore				Skipjack				Yellowfin			
	Greater than 18 lbs.	9-18 lbs.	Less than 9 lbs.	Greater than 7.5 lbs.	Greater than 4-7.5 lbs.	3-4 lbs.	Less than 3 lbs.	Greater than 20 lbs.	7.5-20 lbs.	4-7.5 lbs.	3-4 lbs.	Less than 3 lbs.
1980	1,610	1,610	1,610	850	850	700	545	950	950	810	810	810
	1,635	1,635	1,635	1,100	1,100	1,000	800	1,200	1,200	1,100	1,100	1,100
1981	1,800	1,800	1,800	1,100	1,100	1,000	800	1,200	1,200	1,100	1,100	1,100
1982	1,425	1,425	1,425	1,100	1,100	1,000	800	1,200	1,200	1,100	1,100	1,100
	1,350	1,225	1,000	1,040	1,040	940	740	1,140	1,140	1,040	1,040	1,040
				890	890	700	500	1,170	1,050	890	890	890
1983 1/	1,250	1,250	975	950	850	700	420	1,230	1,050	850	700	420
				900	800	640	420	1,125	990	800	640	400
				880	780	585	250	1,125	975	780	585	250
1984 1/	1,400	1,400	1,125	830	730	500	250	1,085	950	730	500	250
	1,150-1,300	1,150-1,300	875-1,025	850	750	550	250	1,000	900	750	550	250
				763	650	470	235	925	800	650	470	235
1985 1/	1,300	1,300	950	708	610	435	200	865	753	610	435	200
	1,150	1,150	800	738	640	500	275	870	758	640	500	275
	1,000	1,000	800	650	590	490	290	815	715	590	490	290
				700	630	500	300	825	725	630	500	300
1986 1/	-	1,100	750	700	630	500	300	780-800	700	630	500	300
				685	615	485	285	765	685	615	485	285
				700	630	500	300	780	700	630	500	300

1/ Skipjack and yellowfin contract prices may be adjusted at the time of unloading depending upon salt content, temperature of the fish, physical condition of the fish and other quality criteria.

Source: Statistics and Market News, Southwest Region, NMFS, NOAA.

Table 6.-U.S. cannery exvessel (weighted) prices (dollars per short ton), 1980-86.

Year	Albacore		Skipjack		Yellowfin	
	Nominal	Real <u>1/</u>	Nominal	Real <u>1/</u>	Nominal	Real <u>1/</u>
1980	1,659	1,929	1,063	1,236	1,180	1,372
1981	1,800	1,908	1,030	1,092	1,170	1,241
1982	1,387	1,387	965	965	1,123	1,123
1983	1,268	1,220	799	769	1,032	993
1984	1,252	1,160	760	704	982	910
1985	1,087	975	622	558	820	735
1986	1,108	968	616	538	743	649

1/ Adjusted for inflation using GNP implicit price deflator (1982=100).

Source: Statistics and Market News, Southwest Region, NMFS, NOAA.

Table 7.-Cannery imports of frozen tuna (short tons) by country of origin, 1981-86.

Source ^{1/}	1981		1982		1983		1984		1985		1986	
	White	Light ^{2/}	White	Light	White	Light	White	Light	White	Light	White	Light
Brazil	83	5,968	1,443	16,181	1,185	15,154	2,018	7,743	710	15,282	218	12,327
Canary Island	325	-	1,693	1	7,653	5	14,030	10	9,415	16	9,184	20
Cayman Island	-	2,171	-	6,723	-	-	-	9,960	-	11,031	-	8,605
Ecuador	-	-	-	-	-	2,809	-	12,034	-	18,722	-	16,365
Ghana	760	36,188	1,078	27,783	345	23,751	170	6,640	-	-	-	-
Ivory Coast	345	35,805	-	27,862	-	13,783	289	30,997	-	15,887	-	23,549
Japan	6,483	12,307	5,834	12,705	696	18,426	10,946	20,965	6,754	718	4,396	922
Mauritius	1,364	152	4,811	-	4,668	-	5,026	-	5,789	-	6,708	12
Mexico	-	-	-	-	-	-	-	-	-	-	-	3,331
Neth. Antilles	6,202	273	10,054	1,996	8,560	258	9,619	298	12,110	197	14,723	442
Panama	-	23,746	-	29,558	1	8,110	424	13,928	-	15,138	-	24,684
Philippines	-	20,781	-	5,923	-	6,476	-	1,327	-	-	-	-
Reunion	4,738	204	12,036	146	7,438	3	4,363	67	1,521	756	3,605	232
Seychelles	-	-	-	-	-	3,042	-	8,257	262	17,064	-	30,866
Singapore	3,969	7,781	1,386	3,846	4,217	3,761	5,024	-	2,562	-	284	-
Solomon Island	-	22,618	-	928	-	10,600	-	15,836	-	3,390	-	-
South Africa	15,091	1,832	17,044	1	7,304	239	11,856	1,478	21,101	-	26,905	1
South Korea	1,547	4,893	1,001	6,891	5,374	13,830	2,119	11,064	8,874	9,747	11,408	20,673
Taiwan	1,730	169	99	384	5,075	3,851	9,739	9,468	5,947	10,592	11,283	3,324
Uruguay	9,920	1,489	8,835	670	4,480	143	3,228	722	7,425	1,997	9,652	26
Venezuela	394	5,496	-	2,421	1	6,604	-	7,002	147	33,538	28	27,450
Other	34,346	89,724	29,285	35,209	15,858	42,795	13,993	18,807	12,535	5,918	13,898	11,337
Total	87,297	271,597	94,599	179,228	72,855	173,640	92,844	176,603	95,152	159,993	112,292	184,166

^{1/} The source of tuna imports may be the flag of the catcher vessel, country of export or country through which the tuna is transshipped.

^{2/} Light meat includes bigeye, blackfin, bluefin, skipjack and yellowfin tuna.

Source: Statistics and Market News, Southwest Region, NMFS, NOAA.

Table 8.-U.S. imports for consumption by principal sources tuna in airtight containers (oil and water).

SOURCE	1981	1982	1983	1984	1985	1986
QUANTITY (1,000 POUNDS)						
CANADA	---	2	2,106	---	88	
ECUADOR	---	---	---	890	5,175	2,866
INDONESIA	146	595	2,634	2,222	1,388	815
JAPAN	21,271	26,481	20,387	26,855	23,703	10,558
MALAYSIA	696	755	3,083	1,608	3,878	2,401
PHILIPPINES	21,451	27,631	32,018	22,225	30,797	27,982
SOUTH KOREA	31	49	68	82	58	1,443
SPAIN 1/	170	120	133	214	336	237
TAIWAN	15,771	10,704	18,710	17,935	23,472	28,579
THAILAND	10,315	18,667	39,930	89,685	122,666	152,297
OTHER	1,001	2,575	3,260	597	2,387	2,095
TOTAL	70,852	87,579	122,329	162,313	213,948	236,621
VALUE (1,000 DOLLARS)						
CANADA	---	5	2,986	---	75	
ECUADOR	---	---	---	837	4,676	2,603
INDONESIA	209	699	2,679	2,102	1,186	690
JAPAN	36,453	38,561	24,643	29,186	28,142	14,755
MALAYSIA	1,230	1,242	4,068	1,893	4,498	3,160
PHILIPPINES	30,504	31,085	32,291	20,396	25,930	23,124
SOUTH KOREA	58	79	69	75	58	1,230
SPAIN 1/	402	300	268	376	560	557
TAIWAN	24,631	14,366	22,772	22,475	29,801	34,483
THAILAND	15,400	22,711	43,259	89,253	111,852	139,561
OTHER	1,471	4,299	4,289	677	2,360	6,389
TOTAL	110,358	113,347	137,324	167,270	209,138	228,626
UNIT VALUE (PER POUND)						
CANADA	\$ ---	\$ 2.96	\$ 1.42	\$ ---	\$ 0.86	\$ 0.91
ECUADOR	---	---	---	0.94	0.90	0.85
INDONESIA	1.43	1.18	1.01	0.95	0.85	1.40
JAPAN	1.71	1.46	1.20	1.09	1.19	1.32
MALAYSIA	1.77	1.64	1.32	1.18	1.16	0.83
PHILIPPINES	1.42	1.12	1.00	0.92	0.84	0.85
SOUTH KOREA	1.86	1.63	1.02	0.91	0.99	2.35
SPAIN 1/	2.36	2.50	2.01	1.76	1.66	1.21
TAIWAN	1.56	1.34	1.21	1.26	1.27	0.92
THAILAND	1.49	1.22	1.08	1.00	0.91	0.87
OTHER	1.47	1.66	1.31	1.14	0.99	0.99
AVERAGE	1.56	1.29	1.12	1.03	0.98	0.97
PERCENTAGE OF TOTAL QUANTITY						
CANADA	---	***	2	---	***	
ECUADOR	---	---	---	1	2	1
INDONESIA	***	1	2	1	1	***
JAPAN	30	30	17	17	11	5
MALAYSIA	1	1	2	1	2	1
PHILIPPINES	30	32	26	14	14	12
SOUTH KOREA	***	***	***	***	***	1
SPAIN 1/	***	***	***	***	***	***
TAIWAN	22	12	15	11	11	12
THAILAND	15	21	33	55	57	64
OTHER	2	3	3	***	2	3
TOTAL	100	100	100	100	100	100

*** Less than 1 percent, included in "OTHER" listing.

1/ Mainly oil packed

Source: Department of Commerce, Bureau of the Census

Table 9. U.S. purse seine fleet economic indices, 1979-85.

Year	Quantity (tons)	Unit Price (1972 \$)	Revenue Share	Tornquist Theil Index
Outputs:				
Skipjack Tuna				
1979	96582	445.00	0.36	1.0000
1980	116085	596.00	0.46	1.0783
1981	98122	527.00	0.40	1.0060
1982	101837	465.00	0.42	1.0209
1983	155118	371.00	0.50	1.2260
1984	160987	340.00	0.53	1.2553
1985	103689	269.00	0.36	1.0259
Yellowfin Tuna				
1979	146336	528.00	0.64	1.0000
1980	120555	661.00	0.54	0.8920
1981	127253	598.00	0.60	0.9170
1982	122132	542.00	0.58	0.8956
1983	120634	479.00	0.50	0.8955
1984	112080	440.00	0.47	0.8624
1985	138064	354.00	0.64	0.9634
Year	Quantity	Unit Price (1972 \$)	Expense Share	Tornquist Theil Index
Inputs:				
Capital (average number of active vessels)				
1979	125	205604	0.20	1.0000
1980	122	251915	0.19	0.9951
1981	119	313279	0.24	0.9891
1982	121	343845	0.26	0.9925
1983	108	318054	0.27	0.9663
1984	97	258270	0.20	0.9502
1985	81	240305	0.19	0.9175

Table 9. cont.

Year	Quantity	Unit Price (1972 \$)	Expense Share	Tornquist Theil Index
Labor (number of crew days absent)				
1979	575206	67.00	0.31	1.0000
1980	561241	87.00	0.32	0.9924
1981	565003	73.00	0.27	0.9949
1982	569791	62.00	0.22	0.9975
1983	460940	64.00	0.23	0.9425
1984	405498	88.00	0.28	0.9022
1985	331417	72.00	0.24	0.8613
Fuel (1,000's of gallons annually)				
1979	47207	420.00	0.16	1.0000
1980	62409	470.00	0.19	1.0495
1981	70895	430.00	0.20	1.0749
1982	76807	400.00	0.19	1.0878
1983	61130	380.00	0.18	1.0445
1984	64533	370.00	0.19	1.0554
1985	51489	360.00	0.19	1.0149
Other Intermediate (1967 dollar equivalents)				
1979	29266	1.45	0.34	1.0000
1980	29790	1.54	0.30	1.0056
1981	27608	1.62	0.29	0.9819
1982	34939	1.51	0.33	1.0606
1983	28453	1.47	0.32	0.9908
1984	28585	1.44	0.33	0.9922
1985	27651	1.40	0.38	0.9798

Year	Aggregate Output Price Inde	Aggregate Output Index	Aggregate Input Price Index	Aggregate Input Index	Total Factor Prod. Index	Fleet Per. Index
1979	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1980	1.2915	0.9618	1.1850	1.0423	0.9228	1.0057
1981	1.1524	0.9225	1.1912	1.0386	0.8882	0.8683
1982	1.0335	0.9143	1.1624	1.1422	0.8004	0.7117
1983	0.8702	1.0982	1.1256	0.9424	1.1653	0.9009
1984	0.7959	1.0826	1.1169	0.8977	1.2059	0.8592
1985	0.6460	0.9884	1.0119	0.7858	1.2578	0.8038

FIGURE 1. U.S. TOTAL TUNA CANNERY RECEIPTS (IMPORTS PLUS DOMESTICALLY-CAUGHT, 1,000's SHORT TONS), 1985-86.

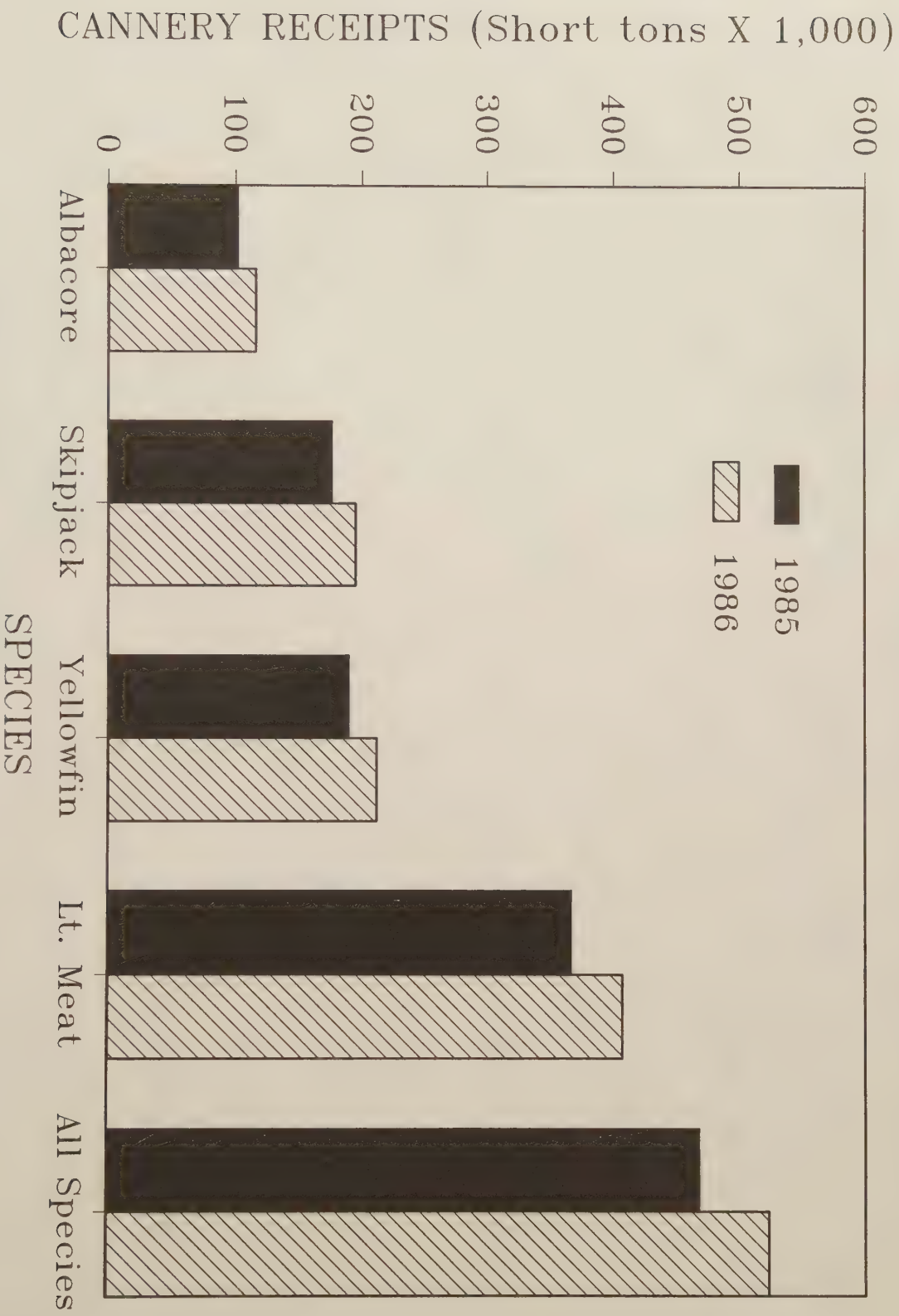


FIGURE 2. ECONOMIC INDICIES FOR THE U.S. TROPICAL TUNA PURSE SEINE FLEET, 1979-85.

